

## C L A I M S

1.           An impurity measuring method characterized by  
2 comprising the steps of:  
3           arranging a sample having a fracture surface  
4 on a table with the fracture surface facing up;  
5           irradiating the fracture surface with light  
6 from a plurality of directions from above the table;  
7           sensing an image of the fracture surface  
8 irradiated with the light;  
9           processing the sensed image into a continuous  
10 tone color image; and  
11           binarizing the continuous tone color image  
12 through comparison between a result of the continuous  
13 tone color image processing and a threshold value.
2.           An impurity measuring method according to  
2 claim 1, characterized in that the step of irradiating  
3 with the light includes the step of irradiating the  
4 fracture surface with indirect illumination.
3.           An impurity measuring method according to  
2 claim 1, characterized in that the step of irradiating  
3 with the light includes the step of irradiating the  
4 fracture surface with indirect illumination of light  
5 from a light source which is reflected by a concave  
6 reflection surface having a substantially semicircular  
7 section.
4.           An impurity measuring method according to

2 claim 1, characterized by further comprising the steps  
3 of:  
4 detecting an image region having a higher  
5 luminance than the threshold value from the binarized  
6 image; and  
7 measuring a pixels count of the detected image  
8 region.

5. An impurity measuring method according to  
2 claim 4, characterized by further comprising the steps  
3 of:  
4 recognizing the detected image region as an  
5 impurity region when the measured pixel count is larger  
6 than a predetermined pixel count; and  
7 avoiding recognizing the detected image region  
8 as an impurity region when the measured pixel count is  
9 smaller than the predetermined pixel count.

6. An impurity measuring method according to  
2 claim 1, characterized in that  
3 the step of arranging a sample includes the  
4 step of arranging an aluminum sample on the table.

7. An impurity measuring method according to  
2 claim 1, characterized in that the step of sensing an  
3 image includes the step of sensing an image of the  
4 fracture surface by a CCD camera.

8. An impurity measuring device characterized by  
2 comprising:  
3 a table on which a sample having a fracture

4 surface facing up;  
5 illuminating means, arranged above the table,  
6 for irradiating the fracture surface with light from a  
7 plurality of directions;  
8 image sensing means for sensing an image of  
9 the fracture surface irradiated with the light;  
10 continuous tone color image processing means  
11 for processing the sensed image into a continuous tone  
12 color image; and  
13 binarizing means for binarizing the continuous  
14 tone color image through comparison between a result of  
15 the continuous tone color image processing and a  
16 threshold value.

9. An impurity measuring device according to  
2 claim 8, characterized in that said illuminating means  
3 includes

4 a light source which emits light, and  
5 a reflection member which reflects the light  
6 from said light source.

10. An impurity measuring device according to  
2 claim 9, characterized in that

3 said reflection member comprises a reflection  
4 dome which has a substantially semicircular section and  
5 a downward concave reflection surface, and

6 said light source comprises a plurality of  
7 light sources which are arranged to face upward along an  
8 inner edge of said concave reflection surface of said

9 reflection dome.

11. An impurity measuring device according to  
2 claim 10, characterized in that said light sources  
3 comprise light-emitting diodes.

12. An impurity measuring device according to  
2 claim 10, characterized in that  
3 said reflection dome has an opening in the  
4 vicinity of a vertex thereof, and  
5 said image sensing means is arranged above the  
6 opening.

13. An impurity measuring device according to  
2 claim 8, characterized by further comprising:  
3 high-luminance region detection means for  
4 detecting an image region having a higher luminance than  
5 the threshold value from the image binarized by said  
6 binarizing means; and  
7 pixel count measuring means for measuring a  
8 pixel count of the image region detected by said  
9 high-luminance region detection means.

14. An impurity measuring device according to  
2 claim 13, characterized by further comprising impurity  
3 region recognizing means for recognizing the image  
4 region detected by said high-luminance region detection  
5 means as an impurity region when the pixel count  
6 measured by said pixel count measuring means is larger  
7 than a predetermined pixel count, and avoiding  
8 recognizing the detected image region as an impurity

9 region when the measured pixel count is smaller than the  
10 predetermined pixel count.

15. An impurity measuring device according to  
2 claim 8, characterized in that the sample comprises  
3 aluminum.

16. An impurity measuring device according to  
2 claim 8, characterized in that said image sensing means  
3 comprises a CCD camera.